

CLAIMS

What is claimed is:

1. Manual actuating apparatus for operating a medical device comprising:

a handle;

a finger loop mounted on the handle for receiving a finger of an operator;

first and second lever members mounted on the handle for grasping engagement by other fingers of the operator, at least one of the lever members and the finger loop being pivotably mounted on the handle for movement between first and second positions; and

a force transmitting member operably connecting at least one of the finger loop and the first and second lever members to the medical device for operating the medical device at a location distant from the handle;

whereby, in the course of operating the medical device, the operator can reposition his fingers between the first and second lever members with rotation of the finger within the finger loop and thereby assure a comfortable hand posture throughout the complete range of operation of the medical device.

2. Manual actuating apparatus as set forth in claim 1

wherein the finger loop is integral with the handle;

wherein the first lever member extends between a mounted end pivotally attached to the handle and a free end; and

wherein the second lever member extends between a free end and a mounted end pivotally attached to the handle at a location intermediate the mounted end and the free end of the first lever member; and

wherein the force transmitting member includes a pull rod attached to the second lever member intermediate the mounted end and the free end and extending away from the finger loop and the first and second lever members to the medical device distant therefrom; and

including:

an interengagement construction between the first lever member and the second lever member such that the first and second lever members move in a coordinated manner between the first and second positions;

whereby, with movement of the first and second lever members from initial positions farthest from the finger loop to extended positions nearest to the finger loop, the pull rod is drawn in a direction away from the medical device with appropriate actuation thereof in one manner; and

whereby, with movement of the free end of the first and second lever members from their respective extended positions toward their initial positions, the pull rod is advanced in the direction toward the medical device with appropriate actuation thereof in an opposite manner.

3. Manual actuating apparatus as set forth in claim 2

wherein the interengagement construction includes:

an elongated side on the first lever member and a first nose member projecting acutely away therefrom toward the second lever member and intermediate the mounted end and the free end, the elongated side and the first nose member together defining a recess;

a second nose member on the second lever member extending away therefrom intermediate the mounted end and the free end and projecting into the recess of the first lever member, the first and second nose members and the elongated side of the first lever member being mutually slidably engageable;

whereby, with movement of the first and second lever members from initial positions farthest from the finger loop to extended positions nearest to the finger loop, the first nose member slidably engages with the second nose member and causes movement of the free ends of the lever members from the initial positions to the extended positions, the pull rod is drawn in a direction away from the medical device with appropriate actuation thereof in one manner; and

whereby, with movement of the free ends of the first and second lever members from their extended positions toward their initial positions, the pull rod is advanced in the direction toward the medical device with appropriate actuation thereof in another manner.

4. Manual actuating apparatus as set forth in claim 1

wherein an upper finger loop is integral with the first lever member at the free end thereof; and

wherein a front finger loop is integral with the second lever member at the free end thereof.

5. Manual actuating apparatus as set forth in claim 1

wherein the finger loop is integral with the handle;

wherein the first lever member extends between a mounted end pivotally attached to the handle and a free end; and

wherein the second lever member extends between a free end and a mounted end pivotally attached to the handle at a location intermediate the mounted end and the free end of the first lever member; and

wherein the interengagement construction includes:

a linkage between the first lever member and the second lever member such that the first and second lever members move in a coordinated manner between the first and second positions; and

the force transmitting member including a pull rod attached to the linkage and extending away from the finger loop and away from the first and second lever members to the medical device distant therefrom;

whereby, with movement of the first and second lever members from initial positions farthest from the

finger loop to extended positions nearest to the finger loop, the pull rod is drawn in a direction away from the medical device with appropriate actuation thereof in one manner; and

whereby, with movement of the free end of the first and second lever members from their extended positions toward their initial positions, the pull rod is advanced in the direction toward the medical device with appropriate actuation thereof in another manner.

6. Manual actuating apparatus as set forth in claim 5.

wherein the linkage includes:

a first link pivotally attached to the first lever member; and

a second link pivotally attached at one end to the second lever member and at its opposite end to the first link away from the first lever member; and

wherein the pull rod is pivotally attached to the linkage.

7. Manual actuating apparatus as set forth in claim 1

wherein the finger loop is integral with the handle;

wherein the first lever member extends between a mounted end pivotally attached to the handle and a free end;

wherein the second lever member extends between a free end and a mounted end pivotally attached to the handle at a location intermediate the mounted end and the free end of the first lever member; and

wherein the force transmitting member includes a pull rod attached to the second lever member intermediate the mounted end and the free end and extending away from the finger loop and the first and second lever members to the medical device distant therefrom; and

including:

an interengagement construction between the first lever member and the second lever member such that the first and second lever members move in a coordinated manner between the first and second positions;

a resilient actuator biasing the first and second lever members toward initial positions, respectively;

whereby, with movement of the first and second lever members from their initial positions farthest from the finger loop to extended positions nearest to the finger loop, the pull rod is drawn in a direction away from the medical device with appropriate actuation thereof in one manner; and

whereby, with movement of the free end of the first and second lever members from their respective extended positions toward their respective initial positions, the pull rod is advanced in the direction toward the medical device with appropriate actuation thereof in an opposite manner.

8. Manual actuating apparatus as set forth in claim 7

wherein the resilient actuator includes:

a bracket fixed on the handle spaced from the second lever member in the direction of the finger loop; and

a compression spring extending between and fixed at its opposite ends, respectively, to the second lever member and to the bracket.

9. Manual actuating apparatus as set forth in claim 1

wherein both the first lever member and the second lever member are integral with the handle;

wherein the finger loop extends between a mounted end pivotally attached to the handle and a free end and has a cam slot formed therein proximate the mounted end; and

wherein the force transmitting member includes a pull rod with an integral cam follower at one end slidably received in the cam slot and extending in a direction away from the finger loop and from the first and second lever members to the medical device distant therefrom; and

wherein the cam slot has opposed first and second ends and a neutral intermediate location and is shaped such that, when the cam follower is at the neutral intermediate location, the pull rod is drawn nearest to the medical device and such that when the

finger loop is moved toward the first lever member, the cam follower moves in the cam slot to the first end and the pull rod is advanced in a direction away from the medical device with appropriate actuation thereof and such that when the finger loop is moved toward the second lever member, the cam follower moves in the cam slot through the neutral intermediate location to the second end and the pull rod is again drawn in a direction away from the medical device with appropriate actuation thereof.

10. Manual actuating apparatus as set forth in claim 9

wherein an upper finger loop is integral with the first lever member at the free end thereof; and

wherein a front finger loop is integral with the second lever member at the free end thereof.

11. Manual actuating apparatus as set forth in claim 9

wherein the finger loop mounted on the handle is adapted to receive a thumb of the operator.